

## Sequence Listing

<110> Genentech, Inc., Hsei, Vanessa  
Koumenis, Iphigenia  
Leong, Steven R.  
Shahrokh, Zahra  
Zapata, Gerardo A.

<120> ANTIBODY FRAGMENT-POLYMER CONJUGATES AND USES OF SAME

<130> P1085R6

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<151> 1999-01-21

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tgggacagat ttactctca ccatacagcca tgtgcagtct gaagacttgg 250  
cagactatatt ctgtcagcaa tataacatct atcctctcac gtccggctcct 300  
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35 40 45  
Ala Leu Ile Tyr Ser Ser Ser Tyr Arg Tyr Ser Gly Val Pro Asp  
50 55 60  
Arg Phe Thr Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile  
65 70 75  
Ser His Val Gln Ser Glu Asp Leu Ala Asp Tyr Phe Cys Gln Gln  
80 85 90

Tyr Asn Ile Tyr Pro Leu Thr Phe Gly Pro Gly Thr Lys Leu Glu  
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Pro Phe Glu  
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caagagcctg gagttgggtc caaccattaa taataatggt gatagcacct 200  
attatccaga cagtgtgaag ggccgattca ccatctcccg agacaatgcc 250  
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catgttttac tgtgcaagag ccctcattag ttcggctact tggtttggtt 350  
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35 40 45  
Glu Leu Val Ala Thr Ile Asn Asn Asn Gly Asp Ser Thr Tyr Tyr  
50 55 60  
Pro Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala  
65 70 75  
Lys Asn Thr Leu Tyr Leu Gln Met Ser Ser Leu Lys Ser Glu Asp  
80 85 90  
Thr Ala Met Phe Tyr Cys Ala Arg Ala Leu Ile Ser Ser Ala Thr  
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115

120

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&lt;221&gt; Artificial Sequence

&lt;222&gt; 1-31

&lt;223&gt; recombinant immunoglobulin

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&lt;210&gt; 21

&lt;211&gt; 31

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; Artificial Sequence

&lt;222&gt; 1-31

&lt;223&gt; recombinant immunoglobulin

&lt;400&gt; 21

gcagcatcag ctcttcgaag ctccagcttg g 31

&lt;210&gt; 22

&lt;211&gt; 21

&lt;212&gt; DNA

&lt;213&gt; Escherichia coli

&lt;400&gt; 22

ccactagtagt gcaagttcac g 21

&lt;210&gt; 23

&lt;211&gt; 33

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; Artificial Sequence

&lt;222&gt; 1-33

&lt;223&gt; recombinantimmunoglobulin

&lt;400&gt; 23

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&lt;210&gt; 24

&lt;211&gt; 714

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; Artificial Sequence

&lt;222&gt; 1-714

&lt;223&gt; recombinant immunoglobulin

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aatgtgggta ctaatgtagc ctggatatcaa cagaaaccag ggcaatctcc 200  
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gtgcagtcctg aagacttggc agactatttc tgtcagcaat ataacatcta 350  
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Gln Lys Phe Met Ser Thr Ser Val Gly Asp Arg Val Ser Val Thr  
35 40 45  
Cys Lys Ala Ser Gln Asn Val Gly Thr Asn Val Ala Trp Tyr Gln  
50 55 60  
Gln Lys Pro Gly Gln Ser Pro Lys Ala Leu Ile Tyr Ser Ser Ser  
65 70 75  
Tyr Arg Tyr Ser Gly Val Pro Asp Arg Phe Thr Gly Ser Gly Ser  
80 85 90

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Thr | Asp | Phe | Thr | Leu | Thr | Ile | Ser | His | Val | Gln | Ser | Glu | Asp |
|     |     |     |     | 95  |     |     |     |     | 100 |     |     |     |     | 105 |
| Leu | Ala | Asp | Tyr | Phe | Cys | Gln | Gln | Tyr | Asn | Ile | Tyr | Pro | Leu | Thr |
|     |     |     |     | 110 |     |     |     |     | 115 |     |     |     |     | 120 |
| Phe | Gly | Pro | Gly | Thr | Lys | Leu | Glu | Leu | Arg | Arg | Ala | Val | Ala | Ala |
|     |     |     |     | 125 |     |     |     |     | 130 |     |     |     |     | 135 |
| Pro | Ser | Val | Phe | Ile | Phe | Pro | Pro | Ser | Asp | Glu | Gln | Leu | Lys | Ser |
|     |     |     |     | 140 |     |     |     |     | 145 |     |     |     |     | 150 |
| Gly | Thr | Ala | Ser | Val | Val | Cys | Leu | Leu | Asn | Asn | Phe | Tyr | Pro | Arg |
|     |     |     |     | 155 |     |     |     |     | 160 |     |     |     |     | 165 |
| Glu | Ala | Lys | Val | Gln | Trp | Lys | Val | Asp | Asn | Ala | Leu | Gln | Ser | Gly |
|     |     |     |     | 170 |     |     |     |     | 175 |     |     |     |     | 180 |
| Asn | Ser | Gln | Glu | Ser | Val | Thr | Glu | Gln | Asp | Ser | Lys | Asp | Ser | Thr |
|     |     |     |     | 185 |     |     |     |     | 190 |     |     |     |     | 195 |
| Tyr | Ser | Leu | Ser | Ser | Thr | Leu | Thr | Leu | Ser | Lys | Ala | Asp | Tyr | Glu |
|     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |     | 210 |
| Lys | His | Lys | Val | Tyr | Ala | Cys | Glu | Val | Thr | His | Gln | Gly | Leu | Ser |
|     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     | 225 |
| Ser | Pro | Val | Thr | Lys | Ser | Phe | Asn | Arg | Gly | Glu | Cys |     |     |     |
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<222> 1-756

<223> recombinant immunoglobulin

<400> 26

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cctggagttg gtcgcaacca ttaataataa tggatagac acctattatc 250
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<222> 1-251

<223> recombinant immunglobulin

<400> 27

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| Met | Lys | Lys | Asn | Ile | Ala | Phe | Leu | Leu | Ala | Ser | Met | Phe | Val | Phe | 1   | 5   | 10  | 15 |
| Ser | Ile | Ala | Thr | Asn | Ala | Tyr | Ala | Glu | Val | Gln | Leu | Val | Glu | Ser | 20  | 25  | 30  |    |
| Gly | Gly | Gly | Leu | Val | Pro | Pro | Gly | Gly | Ser | Leu | Lys | Leu | Ser | Cys | 35  | 40  | 45  |    |
| Ala | Ala | Ser | Gly | Phe | Ile | Phe | Ser | Ser | Tyr | Gly | Met | Ser | Trp | Val | 50  | 55  | 60  |    |
| Arg | Gln | Thr | Pro | Gly | Lys | Ser | Leu | Glu | Leu | Val | Ala | Thr | Ile | Asn | 65  | 70  | 75  |    |
| Asn | Asn | Gly | Asp | Ser | Thr | Tyr | Tyr | Pro | Asp | Ser | Val | Lys | Gly | Arg | 80  | 85  | 90  |    |
| Phe | Thr | Ile | Ser | Arg | Asp | Asn | Ala | Lys | Asn | Thr | Leu | Tyr | Leu | Gln | 95  | 100 | 105 |    |
| Met | Ser | Ser | Leu | Lys | Ser | Glu | Asp | Thr | Ala | Met | Phe | Tyr | Cys | Ala | 110 | 115 | 120 |    |
| Arg | Ala | Leu | Ile | Ser | Ser | Ala | Thr | Trp | Phe | Gly | Tyr | Trp | Gly | Gln | 125 | 130 | 135 |    |
| Gly | Thr | Leu | Val | Thr | Val | Ser | Ala | Ala | Ser | Thr | Lys | Gly | Pro | Ser | 140 | 145 | 150 |    |
| Val | Phe | Pro | Leu | Ala | Pro | Ser | Ser | Lys | Ser | Thr | Ser | Gly | Gly | Thr | 155 | 160 | 165 |    |
| Ala | Ala | Leu | Gly | Cys | Leu | Val | Lys | Asp | Tyr | Phe | Pro | Glu | Pro | Val | 170 | 175 | 180 |    |
| Thr | Val | Ser | Trp | Asn | Ser | Gly | Ala | Leu | Thr | Ser | Gly | Val | His | Thr | 185 | 190 | 195 |    |



Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu Ser Ser  
200 205 210

Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr Tyr Ile  
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Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys Lys  
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ccaatgcata cgctgacatc gtgatgacac agacacc 37

<210> 31

<211> 35

<212> DNA

<213> Mus musculus

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<211> 32

<212> DNA

<213> Mus musculus

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aggctgagga tctgggactt tatttctgct ctcaaagtac acatgttccg 300  
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35 40 45  
Gly Gln Ser Pro Lys Leu Leu Ile Tyr Lys Val Ser Asn Arg Phe  
50 55 60  
Ser Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp  
65 70 75  
Phe Thr Leu Arg Ile Ser Arg Val Glu Ala Glu Asp Leu Gly Leu  
80 85 90  
Tyr Phe Cys Ser Gln Ser Thr His Val Pro Leu Thr Phe Gly Ala  
95 100 105  
Gly Thr Lys Leu Glu Leu Lys Arg Ala Asp Ala Ala Pro Thr Val  
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Ser Ile Phe Pro Pro Ser Ser Glu Gln Leu Lys  
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<211> 242

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<213> Artificial Sequence

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<221> Artificial Sequence

<222> 1-242

<223> recombinant immunoglobulin

<400> 42

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| Met | Lys | Lys | Asn | Ile | Ala | Phe | Leu | Leu | Ala | Ser | Met | Phe | Val | Phe |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Ile | Ala | Thr | Asn | Ala | Tyr | Ala | Asp | Ile | Val | Met | Thr | Gln | Thr |
|     |     |     | 20  |     |     |     |     |     | 25  |     |     |     |     | 30  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Leu | Ser | Leu | Pro | Val | Ser | Leu | Gly | Asp | Gln | Ala | Ser | Ile | Ser |
|     |     |     | 35  |     |     |     |     |     | 40  |     |     |     |     | 45  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Cys | Arg | Ser | Ser | Gln | Ser | Leu | Val | His | Gly | Ile | Gly | Asn | Thr | Tyr |
|     |     |     | 50  |     |     |     |     |     | 55  |     |     |     |     | 60  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | His | Trp | Tyr | Leu | Gln | Lys | Pro | Gly | Gln | Ser | Pro | Lys | Leu | Leu |
|     |     |     | 65  |     |     |     |     |     | 70  |     |     |     |     | 75  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Tyr | Lys | Val | Ser | Asn | Arg | Phe | Ser | Gly | Val | Pro | Asp | Arg | Phe |
|     |     |     | 80  |     |     |     |     |     | 85  |     |     |     |     | 90  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Gly | Ser | Gly | Ser | Gly | Thr | Asp | Phe | Thr | Leu | Arg | Ile | Ser | Arg |
|     |     |     | 95  |     |     |     |     |     | 100 |     |     |     |     | 105 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Glu | Ala | Glu | Asp | Leu | Gly | Leu | Tyr | Phe | Cys | Ser | Gln | Ser | Thr |
|     |     |     | 110 |     |     |     |     |     | 115 |     |     |     |     | 120 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| His | Val | Pro | Leu | Thr | Phe | Gly | Ala | Gly | Thr | Lys | Leu | Glu | Leu | Lys |
|     |     |     | 125 |     |     |     |     |     | 130 |     |     |     |     | 135 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Ala | Val | Ala | Ala | Pro | Thr | Val | Phe | Ile | Phe | Pro | Pro | Ser | Ser |
|     |     |     | 140 |     |     |     |     |     | 145 |     |     |     |     | 150 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Gln | Leu | Lys | Ser | Gly | Thr | Ala | Ser | Val | Val | Cys | Leu | Leu | Asn |
|     |     |     | 155 |     |     |     |     |     | 160 |     |     |     |     | 165 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asn | Phe | Tyr | Pro | Arg | Glu | Ala | Lys | Val | Gln | Trp | Lys | Val | Asp | Asn |
|     |     |     | 170 |     |     |     |     |     | 175 |     |     |     |     | 180 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ala | Leu | Gln | Ser | Gly | Asn | Ser | Gln | Glu | Ser | Val | Thr | Glu | Gln | Asp |
|     |     |     | 185 |     |     |     |     |     | 190 |     |     |     |     | 195 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Lys | Asp | Ser | Thr | Tyr | Ser | Leu | Ser | Ser | Thr | Leu | Thr | Leu | Ser |
|     |     |     | 200 |     |     |     |     |     | 205 |     |     |     |     | 210 |

Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr  
215 220 225

His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly  
230 235 240

Glu Cys  
242

<210> 43

<211> 762

<212> DNA

<213> Artificial Sequence

<220>

<221> Artificial Sequence

<222> 1-762

<223> recombinant immunoglobulin

<400> 43

atgaaaaaga atatcgcat tcttcttgca tctatgttcg ttttttctat 50

tgctacaaac gcgtacgctg agattcagct gcagcagtct ggacctgagc 100

tgatgaagcc tggggcttca gtgaagatat cctgcaaggc ttctgggttat 150

tcattcagta gccactacat gcactgggtg aagcagagcc atggaaagag 200

ccttgagtgg attggctaca ttgatccttc caatggtgaa actacttaca 250

accagaaatt caagggcaag gccacattga ctgtagacac atcttccagc 300

acagccaacg tgcatctcag cagcctgaca tctgatgact ctgcagtcta 350

tttctgtgca agaggggact atagatacaa cggcgactgg tttttcgatg 400

tctggggcgc agggaccacg gtcaccgtct cctccgcctc caccaagggc 450

ccatcggtct tccccctggc accctcctcc aagagcacct ctggggggcac 500

agcggccctg ggctgcctgg tcaaggacta cttccccgaa ccggtgacgg 550

tgctgtggaa ctcaggcgcc ctgaccagcg gcgtgcacac cttcccggct 600

gtcctacagt cctcaggact ctactccctc agcagcgtgg tgaccgtgcc 650

ctccagcagc ttgggcaccc agacctacat ctgcaacgtg aatcacaagc 700

ccagcaacac caaggtggac aagaaagttg agcccaaatc ttgtgacaaa 750

actcacacat ga 762

<210> 44

<211> 253

<212> PRT

<213> Artificial Sequence

<220>

<221> Artificial Sequence

<222> 1-253

<223> recombinant immunoglobulin

<400> 44

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Lys | Lys | Asn | Ile | Ala | Phe | Leu | Leu | Ala | Ser | Met | Phe | Val | Phe |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |
| Ser | Ile | Ala | Thr | Asn | Ala | Tyr | Ala | Glu | Ile | Gln | Leu | Gln | Gln | Ser |
|     |     |     | 20  |     |     |     |     |     | 25  |     |     |     |     | 30  |
| Gly | Pro | Glu | Leu | Met | Lys | Pro | Gly | Ala | Ser | Val | Lys | Ile | Ser | Cys |
|     |     |     | 35  |     |     |     |     |     | 40  |     |     |     |     | 45  |
| Lys | Ala | Ser | Gly | Tyr | Ser | Phe | Ser | Ser | His | Tyr | Met | His | Trp | Val |
|     |     |     | 50  |     |     |     |     |     | 55  |     |     |     |     | 60  |
| Lys | Gln | Ser | His | Gly | Lys | Ser | Leu | Glu | Trp | Ile | Gly | Tyr | Ile | Asp |
|     |     |     | 65  |     |     |     |     |     | 70  |     |     |     |     | 75  |
| Pro | Ser | Asn | Gly | Glu | Thr | Thr | Tyr | Asn | Gln | Lys | Phe | Lys | Gly | Lys |
|     |     |     | 80  |     |     |     |     |     | 85  |     |     |     |     | 90  |
| Ala | Thr | Leu | Thr | Val | Asp | Thr | Ser | Ser | Ser | Thr | Ala | Asn | Val | His |
|     |     |     | 95  |     |     |     |     |     | 100 |     |     |     |     | 105 |
| Leu | Ser | Ser | Leu | Thr | Ser | Asp | Asp | Ser | Ala | Val | Tyr | Phe | Cys | Ala |
|     |     |     | 110 |     |     |     |     |     | 115 |     |     |     |     | 120 |
| Arg | Gly | Asp | Tyr | Arg | Tyr | Asn | Gly | Asp | Trp | Phe | Phe | Asp | Val | Trp |
|     |     |     | 125 |     |     |     |     |     | 130 |     |     |     |     | 135 |
| Gly | Ala | Gly | Thr | Thr | Val | Thr | Val | Ser | Ser | Ala | Ser | Thr | Lys | Gly |
|     |     |     | 140 |     |     |     |     |     | 145 |     |     |     |     | 150 |
| Pro | Ser | Val | Phe | Pro | Leu | Ala | Pro | Ser | Ser | Lys | Ser | Thr | Ser | Gly |
|     |     |     | 155 |     |     |     |     |     | 160 |     |     |     |     | 165 |
| Gly | Thr | Ala | Ala | Leu | Gly | Cys | Leu | Val | Lys | Asp | Tyr | Phe | Pro | Glu |
|     |     |     | 170 |     |     |     |     |     | 175 |     |     |     |     | 180 |
| Pro | Val | Thr | Val | Ser | Trp | Asn | Ser | Gly | Ala | Leu | Thr | Ser | Gly | Val |
|     |     |     | 185 |     |     |     |     |     | 190 |     |     |     |     | 195 |
| His | Thr | Phe | Pro | Ala | Val | Leu | Gln | Ser | Ser | Gly | Leu | Tyr | Ser | Leu |
|     |     |     | 200 |     |     |     |     |     | 205 |     |     |     |     | 210 |
| Ser | Ser | Val | Val | Thr | Val | Pro | Ser | Ser | Ser | Leu | Gly | Thr | Gln | Thr |
|     |     |     | 215 |     |     |     |     |     | 220 |     |     |     |     | 225 |
| Tyr | Ile | Cys | Asn | Val | Asn | His | Lys | Pro | Ser | Asn | Thr | Lys | Val | Asp |
|     |     |     | 230 |     |     |     |     |     | 235 |     |     |     |     | 240 |
| Lys | Lys | Val | Glu | Pro | Lys | Ser | Cys | Asp | Lys | Thr | His | Thr |     |     |
|     |     |     | 245 |     |     |     |     |     | 250 |     |     | 253 |     |     |

<210> 45

<211> 114

<212> PRT

<213> Mus musculus

<400> 45

Asp Ile Val Met Thr Gln Thr Pro Leu Ser Leu Pro Val Ser Leu

|   |     |     |     |
|---|-----|-----|-----|
| 1   | 5   | 10  | 15  |
| Gly Asp Gln Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu Val | 20  | 25  | 30  |
| His Gly Ile Gly Asn Thr Tyr Leu His Trp Tyr Leu Gln Lys Pro | 35  | 40  | 45  |
| Gly Gln Ser Pro Lys Leu Leu Ile Tyr Tyr Lys Val Ser Asn Arg | 50  | 55  | 60  |
| Phe Ser Gly Val Pro Asp Arg Phe Ser Asp Ser Gly Ser Gly Thr | 65  | 70  | 75  |
| Asp Phe Thr Leu Arg Ile Ser Arg Val Glu Ala Glu Asp Leu Gly | 80  | 85  | 90  |
| Leu Tyr Phe Cys Ser Gln Ser Thr His Val Pro Leu Thr Phe Gly | 95  | 100 | 105 |
| Ala Gly Thr Lys Leu Glu Leu Lys Arg                         | 110 | 114 |     |

<210> 46  
 <211> 114  
 <212> PRT  
 <213> Artificial Sequence  
  
 <220>  
 <221> Artificial Sequence  
 <222> 1-114  
 <223> recombinant immunoglobulin

|   |
|---|
| <400> 46  |
| Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val |
| 1 5 10 15   |
| Gly Asp Arg Val Thr Ile Thr Cys Arg Ser Ser Gln Ser Leu Val |
| 20 25 30  |
| His Gly Ile Gly Asn Thr Tyr Leu His Trp Tyr Gln Gln Lys Pro |
| 35 40 45  |
| Gly Lys Ala Pro Lys Leu Leu Ile Tyr Tyr Lys Val Ser Asn Arg |
| 50 55 60  |
| Phe Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr |
| 65 70 75  |
| Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala |
| 80 85 90  |
| Thr Tyr Tyr Cys Ser Gln Ser Thr His Val Pro Leu Thr Phe Gly |
| 95 100 105  |
| Gln Gly Thr Lys Val Glu Ile Lys Arg                         |
| 110 114   |

<210> 47  
 <211> 109  
 <212> PRT



<213> Homo sapiens

<400> 47

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val  
1 5 10 15

Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Lys Thr Ile Ser  
20 25 30

Lys Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys  
35 40 45

Leu Leu Ile Tyr Tyr Ser Gly Ser Thr Leu Glu Ser Gly Val Pro  
50 55 60

Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr  
65 70 75

Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln  
80 85 90

Gln His Asn Glu Tyr Pro Leu Thr Phe Gly Gln Gly Thr Lys Val  
95 100 105

Glu Ile Lys Arg  
109

<210> 48

<211> 117

<212> PRT

<213> Mus Musculus

<400> 48

Glu Ile Gln Leu Gln Gln Ser Gly Pro Glu Leu Met Lys Pro Gly  
1 5 10 15

Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Ser Phe Ser  
20 25 30

Ser His Tyr Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu  
35 40 45

Glu Trp Ile Gly Tyr Ile Asp Pro Ser Asn Gly Glu Thr Thr Tyr  
50 55 60

Asn Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Val Asp Thr Ser  
65 70 75

Ser Ser Thr Ala Asn Val His Leu Ser Ser Leu Thr Ser Asp Asp  
80 85 90

Ser Ala Val Tyr Phe Cys Ala Ala Arg Gly Asp Tyr Arg Tyr Asn  
95 100 105

Gly Asp Trp Phe Phe Asp Val Trp Gly Ala Gly Thr  
110 115 117

<210> 49

<211> 117

<212> PRT

<213> Artificial Sequence

<220>  
<221> Artificial Sequence  
<222> 1-117  
<223> recombinant immunoglobulin

<400> 49

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Glu | Val | Gln | Leu | Val | Glu | Ser | Gly | Gly | Gly | Leu | Val | Gln | Pro | Gly |  |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |  |
| Gly | Ser | Leu | Arg | Leu | Ser | Cys | Ala | Ala | Ser | Gly | Tyr | Ser | Phe | Ser |  |
|     |     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |  |
| Ser | His | Tyr | Met | His | Trp | Val | Arg | Gln | Ala | Pro | Gly | Lys | Gly | Leu |  |
|     |     |     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |  |
| Glu | Trp | Val | Gly | Tyr | Ile | Asp | Pro | Ser | Asn | Gly | Glu | Thr | Thr | Tyr |  |
|     |     |     |     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |  |
| Asn | Gln | Lys | Phe | Lys | Gly | Arg | Phe | Thr | Ile | Ser | Arg | Asp | Asn | Ser |  |
|     |     |     |     | 65  |     |     |     |     | 70  |     |     |     |     | 75  |  |
| Lys | Asn | Thr | Leu | Tyr | Leu | Gln | Met | Asn | Ser | Leu | Arg | Ala | Glu | Asp |  |
|     |     |     |     | 80  |     |     |     |     | 85  |     |     |     |     | 90  |  |
| Thr | Ala | Val | Tyr | Tyr | Cys | Ala | Ala | Arg | Gly | Asp | Tyr | Arg | Tyr | Asn |  |
|     |     |     |     | 95  |     |     |     |     | 100 |     |     |     |     | 105 |  |
| Gly | Asp | Trp | Phe | Phe | Asp | Val | Trp | Gly | Gln | Gly | Thr |     |     |     |  |
|     |     |     |     | 110 |     |     |     |     | 115 |     | 117 |     |     |     |  |

<210> 50  
<211> 116  
<212> PRT  
<213> Homo sapiens

<400> 50

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Glu | Val | Gln | Leu | Val | Glu | Ser | Gly | Gly | Gly | Leu | Val | Gln | Pro | Gly |  |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |  |
| Gly | Ser | Leu | Arg | Leu | Ser | Cys | Ala | Ala | Ser | Gly | Phe | Ser | Phe | Thr |  |
|     |     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |  |
| Gly | His | Trp | Met | Asn | Trp | Val | Arg | Gln | Ala | Pro | Gly | Lys | Gly | Leu |  |
|     |     |     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |  |
| Glu | Trp | Val | Gly | Met | Ile | His | Pro | Ser | Asp | Ser | Glu | Thr | Arg | Tyr |  |
|     |     |     |     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |  |
| Ala | Asp | Ser | Val | Lys | Gly | Arg | Phe | Thr | Ile | Ser | Arg | Asp | Asn | Ser |  |
|     |     |     |     | 65  |     |     |     |     | 70  |     |     |     |     | 75  |  |
| Lys | Asn | Thr | Leu | Tyr | Leu | Gln | Met | Asn | Ser | Leu | Arg | Ala | Glu | Asp |  |
|     |     |     |     | 80  |     |     |     |     | 85  |     |     |     |     | 90  |  |
| Thr | Ala | Val | Tyr | Tyr | Cys | Ala | Ala | Arg | Gly | Ile | Tyr | Phe | Tyr | Gly |  |
|     |     |     |     | 95  |     |     |     |     | 100 |     |     |     |     | 105 |  |
| Thr | Thr | Tyr | Phe | Asp | Tyr | Trp | Gly | Gln | Gly | Thr |     |     |     |     |  |
|     |     |     |     | 110 |     |     |     |     | 115 | 116 |     |     |     |     |  |

[illegible]

<400> 51

Ser Ile Ala Thr Asn Ala Tyr Ala Asp Ile Gln Met Thr Gln Ser  
20 25 30

Pro Ser Ser Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr  
35 40 45

Cys Arg Ser Ser Gln Ser Leu Val His Gly Ile Gly Asn Thr Tyr  
50 55 60

Leu His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu  
65 70 75

Ile Tyr Lys Val Ser Asn Arg Phe Ser Gly Val Pro Ser Arg Phe  
80 85 90

Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser  
95 100 105

Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Ser Gln Ser Thr  
110 115 120

His Val Pro Leu Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys  
125 130 135

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp  
140 145 150

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn  
155 160 165

Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn  
170 175 180

Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp  
185 190 195

Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser  
200 205 210

Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr  
215 220 225

His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly  
230 235 240

Glu Cys  
242

<210> 52  
 <211> 253  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <221> Artificial Sequence  
 <222> 1-253  
 <223> recombinant immunoglobulin

<400> 52  
 Met Lys Lys Asn Ile Ala Phe Leu Leu Ala Ser Met Phe Val Phe  
   1                  5                  10                  15  
 Ser Ile Ala Thr Asn Ala Tyr Ala Glu Val Gln Leu Val Gln Ser  
                   20                  25                  30  
 Gly Gly Gly Leu Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys  
                   35                  40                  45  
 Ala Ala Ser Gly Tyr Ser Phe Ser Ser His Tyr Met His Trp Val  
                   50                  55                  60  
 Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Gly Tyr Ile Asp  
                   65                  70                  75  
 Pro Ser Asn Gly Glu Thr Thr Tyr Asn Gln Lys Phe Lys Gly Arg  
                   80                  85                  90  
 Phe Thr Leu Ser Arg Asp Asn Ser Lys Asn Thr Ala Tyr Leu Gln  
                   95                  100                  105  
 Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala  
                   110                  115                  120  
 Arg Gly Asp Tyr Arg Tyr Asn Gly Asp Trp Phe Phe Asp Val Trp  
                   125                  130                  135  
 Gly Gln Gly Thr Leu Val Thr Val Ser Ser Ala Ser Thr Lys Gly  
                   140                  145                  150  
 Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser Gly  
                   155                  160                  165  
 Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro Glu  
                   170                  175                  180  
 Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly Val  
                   185                  190                  195  
 His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser Leu  
                   200                  205                  210  
 Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr  
                   215                  220                  225  
 Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp  
                   230                  235                  240  
 Lys Lys Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr

245

250

253

<210> 53  
 <211> 159  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <221> Artificial Sequence  
 <222> 1-159  
 <223> recombinant phage protein

<400> 53  
 Ser Gly Gly Gly Ser Gly Ser Gly Asp Phe Asp Tyr Glu Lys Met  
   1                  5                  10                  15  
 Ala Asn Ala Asn Lys Gly Ala Met Thr Glu Asn Ala Asp Glu Asn  
                   20                  25                  30  
 Ala Leu Gln Ser Asp Ala Lys Gly Lys Leu Asp Ser Val Ala Thr  
                   35                  40                  45  
 Asp Tyr Gly Ala Ala Ile Asp Gly Phe Ile Gly Asp Val Ser Gly  
                   50                  55                  60  
 Leu Ala Asn Gly Asn Gly Ala Thr Gly Asp Phe Ala Gly Ser Ser  
                   65                  70                  75  
 Asn Ser Gln Met Ala Gln Val Gly Asp Gly Asp Asn Ser Pro Leu  
                   80                  85                  90  
 Met Asn Asn Phe Arg Gln Tyr Leu Pro Ser Leu Pro Gln Ser Val  
                   95                  100                 105  
 Glu Cys Arg Pro Phe Val Phe Ser Ala Gly Lys Pro Tyr Glu Phe  
                  110                 115                 120  
 Ser Ile Asp Cys Asp Lys Ile Asn Leu Phe Arg Gly Val Phe Ala  
                  125                 130                 135  
 Phe Leu Leu Tyr Val Ala Thr Phe Met Tyr Val Phe Ser Thr Phe  
                  140                 145                 150  
 Ala Asn Ile Leu Arg Asn Lys Glu Ser  
                  155                 159

<210> 54  
 <211> 780  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <221> Artificial Sequence  
 <222> 1-780  
 <223> recombinant immunoglobulin

<400> 54  
 atgaaaaaga atatgcgatt tcttcttgca tctatgttcg ttttttctat 50  
 tgctacaaac gcatacgtg atatccagat gaccagtc ccgagctccc 100

tgtccgcctc tgtgggcat agggtcacca tcacctgcag gtcaagtcaa 150  
 agcttagtac atggtatagg taacacgtat ttacactggg atcaacagaa 200  
 accaggaaaa gctccgaaac tactgattta caaagtatcc aatcgattct 250  
 ctggagtccc ttctcgcttc tctggatccg gttctgggac ggatttcact 300  
 ctgaccatca gcagtctgca gccagaagac ttcgcaactt attactgttc 350  
 acagagtact catgtcccg ctcagtttgg acaggggtacc aaggtggaga 400  
 tcaaacgaac tgtggctgca ccatctgtct tcatcttccc gccatctgat 450  
 gagcagttga aatctggaac tgcttctgtt gtgtgcctgc tgaataactt 500  
 ctatcccaga gaggccaaag tacagtggaa ggtggataac gccctccaat 550  
 cgggtaactc ccaggagagt gtcacagagc aggacagcaa ggacagcacc 600  
 tacagcctca gcagcaccct gacgctgagc aaagcagact acgagaaaca 650  
 caaagtctac gcctgcgaag tcacccatca gggcctgagc tcgcccgtca 700  
 caaagagctt caacagggga gagtggttaag ctgacacctc acgccggacg 750  
 catcgtggcc ctagtacgca actagtcgta 780

<210> 55

<211> 253

<212> PRT

<213> Artificial Sequence

<220>

<221> Artificial Sequence

<222> 1-253

<223> recombinant immunoglobulin

<400> 55

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Lys | Lys | Asn | Ile | Ala | Phe | Leu | Leu | Ala | Ser | Met | Phe | Val | Phe |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Ile | Ala | Thr | Asn | Ala | Tyr | Ala | Glu | Val | Gln | Leu | Val | Glu | Ser |
|     |     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Gly | Gly | Leu | Val | Gln | Pro | Gly | Gly | Ser | Leu | Arg | Leu | Ser | Cys |
|     |     |     | 35  |     |     |     |     |     | 40  |     |     |     |     | 45  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ala | Ala | Ser | Gly | Tyr | Ser | Phe | Ser | Ser | His | Tyr | Met | His | Trp | Val |
|     |     |     | 50  |     |     |     |     |     | 55  |     |     |     |     | 60  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Gln | Ala | Pro | Gly | Lys | Gly | Leu | Glu | Trp | Val | Gly | Tyr | Ile | Asp |
|     |     |     | 65  |     |     |     |     |     | 70  |     |     |     |     | 75  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Ser | Asn | Gly | Glu | Thr | Thr | Tyr | Asn | Gln | Lys | Phe | Lys | Gly | Arg |
|     |     |     | 80  |     |     |     |     |     | 85  |     |     |     |     | 90  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Phe | Thr | Leu | Ser | Arg | Asp | Asn | Ser | Lys | Asn | Thr | Ala | Tyr | Leu | Gln |
|     |     |     | 95  |     |     |     |     |     | 100 |     |     |     |     | 105 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Asn | Ser | Leu | Arg | Ala | Glu | Asp | Thr | Ala | Val | Tyr | Tyr | Cys | Ala |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

|                 | 110                 |                     | 115 |  | 120 |
|-----------------|---------------------|---------------------|-----|--|-----|
| Arg Gly Asp Tyr | Arg Tyr Asn Gly Asp | Trp Phe Phe Asp Val | Trp |  |     |
|                 | 125                 |                     | 130 |  | 135 |
| Gly Gln Gly Thr | Leu Val Thr Val Ser | Ser Ala Ser Thr Lys | Gly |  |     |
|                 | 140                 |                     | 145 |  | 150 |
| Pro Ser Val Phe | Pro Leu Ala Pro Ser | Ser Lys Ser Thr Ser | Gly |  |     |
|                 | 155                 |                     | 160 |  | 165 |
| Gly Thr Ala Ala | Leu Gly Cys Leu Val | Lys Asp Tyr Phe Pro | Glu |  |     |
|                 | 170                 |                     | 175 |  | 180 |
| Pro Val Thr Val | Ser Trp Asn Ser Gly | Ala Leu Thr Ser Gly | Val |  |     |
|                 | 185                 |                     | 190 |  | 195 |
| His Thr Phe Pro | Ala Val Leu Gln Ser | Ser Gly Leu Tyr Ser | Leu |  |     |
|                 | 200                 |                     | 205 |  | 210 |
| Ser Ser Val Val | Thr Val Pro Ser Ser | Ser Leu Gly Thr Gln | Thr |  |     |
|                 | 215                 |                     | 220 |  | 225 |
| Tyr Ile Cys Asn | Val Asn His Lys Pro | Ser Asn Thr Lys Val | Asp |  |     |
|                 | 230                 |                     | 235 |  | 240 |
| Lys Lys Val Glu | Pro Lys Ser Cys Asp | Lys Thr His Thr     |     |  |     |
|                 | 245                 |                     | 250 |  | 253 |

<210> 56

<211> 242

<212> PRT

<213> Artificial Sequence

<220>

<221> Artificial Sequence

<222> 1-242

<223> recombinant immunoglobulin

<400> 56

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Lys | Lys | Asn | Ile | Ala | Phe | Leu | Leu | Ala | Ser | Met | Phe | Val | Phe |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Ile | Ala | Thr | Asn | Ala | Tyr | Ala | Asp | Ile | Gln | Met | Thr | Gln | Ser |
|     |     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Ser | Ser | Leu | Ser | Ala | Ser | Val | Gly | Asp | Arg | Val | Thr | Ile | Thr |
|     |     |     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Cys | Arg | Ser | Ser | Gln | Ser | Leu | Val | His | Gly | Ile | Gly | Ala | Thr | Tyr |
|     |     |     |     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | His | Trp | Tyr | Gln | Gln | Lys | Pro | Gly | Lys | Ala | Pro | Lys | Leu | Leu |
|     |     |     |     | 65  |     |     |     |     | 70  |     |     |     |     | 75  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ile | Tyr | Lys | Val | Ser | Asn | Arg | Phe | Ser | Gly | Val | Pro | Ser | Arg | Phe |
|     |     |     |     | 80  |     |     |     |     | 85  |     |     |     |     | 90  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Gly | Ser | Gly | Ser | Gly | Thr | Asp | Phe | Thr | Leu | Thr | Ile | Ser | Ser |
|     |     |     |     | 95  |     |     |     |     | 100 |     |     |     |     | 105 |

Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Ser Gln Ser Thr  
110 115 120

His Val Pro Leu Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys  
125 130 135

Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp  
140 145 150

Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn  
155 160 165

Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn  
170 175 180

Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp  
185 190 195

Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser  
200 205 210

Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu Val Thr  
215 220 225

His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn Arg Gly  
230 235 240

Glu Cys  
242

<210> 57

<211> 45

<212> PRT

<213> Artificial Sequence

<220>

<221> Artificial Sequence

<222> 1-45

<223> recombinant leucine zipper peptide

<400> 57

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Gln Leu Glu Asp Lys Val Glu Glu Leu Leu Ser Lys Asn Tyr His  
20 25 30

Leu Glu Asn Glu Val Ala Arg Leu Lys Lys Leu Val Gly Glu Arg  
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<210> 58

<211> 780

<212> DNA

<213> Artificial Sequence

<220>

<221> Artificial Sequence

<222> 1-780

<223> recombinant immunoglobulin

<400> 58



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 tgtccgcctc tgtgggcgat aggggtcacca tcacctgcag gtcaagtcaa 150  
 agcttagtac atggtatagg tgctacgtat ttacactggg atcaacagaa 200  
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 tcaaacgaac tgtggctgca ccatctgtct tcatcttccc gccatctgat 450  
 gagcagttga aatctggaac tgcttctgtt gtgtgcctgc tgaataactt 500  
 ctatcccaga gaggccaaag tacagtggaa ggtggataac gccctccaat 550  
 cgggtaactc ccaggagagt gtcacagagc aggacagcaa ggacagcacc 600  
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 caaagtctac gcctgcgaag tcacccatca gggcctgagc tcgcccgtca 700  
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<210> 59

<211> 927

<212> DNA

<213> Artificial Sequence

<220>

<221> Artificial Sequence

<222> 1-927

<223> recombinant immunoglobulin

<400> 59

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 aggttcagct agtgcagtct ggcgggtggc tgggtgcagcc aggggggtca 150  
 ctccgtttgt cctgtgcagc ttctggctac tccttctcga gtcactatat 200  
 gcactgggtc cgtcaggccc cgggtaaggc cctggaatgg gttggatata 250  
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 ttacttttat ctgcgacaa ctccaaaaac acagcatacc tgcagatgaa 350  
 cagcctgcgt gctgaggaca ctgccgtcta ttactgtgca agaggggatt 400  
 atcgtacaaa tgggtgactgg ttcttcgacg tctgggggtca aggaaccctg 450

gtcacccgtct cctcggcctc caccaagggc ccacggtct tccccctggc 500  
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<210> 60

<211> 298

<212> PRT

<213> Artificial Sequence

<220>

<221> Artificial Sequence

<222> 1-298

<223> recombinant immunoglobulin

<400> 60

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Lys | Lys | Asn | Ile | Ala | Phe | Leu | Leu | Ala | Ser | Met | Phe | Val | Phe |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Ile | Ala | Thr | Asn | Ala | Tyr | Ala | Glu | Val | Gln | Leu | Val | Gln | Ser |
|     |     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Gly | Gly | Leu | Val | Gln | Pro | Gly | Gly | Ser | Leu | Arg | Leu | Ser | Cys |
|     |     |     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ala | Ala | Ser | Gly | Tyr | Ser | Phe | Ser | Ser | His | Tyr | Met | His | Trp | Val |
|     |     |     |     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Gln | Ala | Pro | Gly | Lys | Gly | Leu | Glu | Trp | Val | Gly | Tyr | Ile | Asp |
|     |     |     |     | 65  |     |     |     |     | 70  |     |     |     |     | 75  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Ser | Asn | Gly | Glu | Thr | Thr | Tyr | Asn | Gln | Lys | Phe | Lys | Gly | Arg |
|     |     |     |     | 80  |     |     |     |     | 85  |     |     |     |     | 90  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Phe | Thr | Leu | Ser | Arg | Asp | Asn | Ser | Lys | Asn | Thr | Ala | Tyr | Leu | Gln |
|     |     |     |     | 95  |     |     |     |     | 100 |     |     |     |     | 105 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Asn | Ser | Leu | Arg | Ala | Glu | Asp | Thr | Ala | Val | Tyr | Tyr | Cys | Ala |
|     |     |     |     | 110 |     |     |     |     | 115 |     |     |     |     | 120 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Gly | Asp | Tyr | Arg | Tyr | Asn | Gly | Asp | Trp | Phe | Phe | Asp | Val | Trp |
|     |     |     |     | 125 |     |     |     |     | 130 |     |     |     |     | 135 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Gln | Gly | Thr | Leu | Val | Thr | Val | Ser | Ser | Ala | Ser | Thr | Lys | Gly |
|     |     |     |     | 140 |     |     |     |     | 145 |     |     |     |     | 150 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Ser | Val | Phe | Pro | Leu | Ala | Pro | Ser | Ser | Lys | Ser | Thr | Ser | Gly |
|     |     |     |     | 155 |     |     |     |     | 160 |     |     |     |     | 165 |
| Gly | Thr | Ala | Ala | Leu | Gly | Cys | Leu | Val | Lys | Asp | Tyr | Phe | Pro | Glu |
|     |     |     |     | 170 |     |     |     |     | 175 |     |     |     |     | 180 |
| Pro | Val | Thr | Val | Ser | Trp | Asn | Ser | Gly | Ala | Leu | Thr | Ser | Gly | Val |
|     |     |     |     | 185 |     |     |     |     | 190 |     |     |     |     | 195 |
| His | Thr | Phe | Pro | Ala | Val | Leu | Gln | Ser | Ser | Gly | Leu | Tyr | Ser | Leu |
|     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |     | 210 |
| Ser | Ser | Val | Val | Thr | Val | Pro | Ser | Ser | Ser | Leu | Gly | Thr | Gln | Thr |
|     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     | 225 |
| Tyr | Ile | Cys | Asn | Val | Asn | His | Lys | Pro | Ser | Asn | Thr | Lys | Val | Asp |
|     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |
| Lys | Lys | Val | Glu | Pro | Lys | Ser | Cys | Asp | Lys | Thr | His | Thr | Cys | Pro |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |
| Pro | Cys | Pro | Ala | Pro | Glu | Leu | Leu | Gly | Gly | Arg | Met | Lys | Gln | Leu |
|     |     |     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |
| Glu | Asp | Lys | Val | Glu | Glu | Leu | Leu | Ser | Lys | Asn | Tyr | His | Leu | Glu |
|     |     |     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |
| Asn | Glu | Val | Ala | Arg | Leu | Lys | Lys | Leu | Val | Gly | Glu | Arg |     |     |
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<210> 61

<211> 6563

<212> DNA

<213> Artificial Sequence

<220>

<221> Artificial Sequence

<222> 1-6563

<223> recombinant immunoglobulin

<400> 61

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gggcgctgta cgaggtaaag cccgatgccg gcattcctga cgacgatacg 250
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tcggtacccg gggatcctct cgagggttgag gtgattttat gaaaaagaat 450
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[illegible]

[illegible]

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| cacgggtgcg | catgatcgtg | ctcctgtcgt  | tgaggacccg  | gctaggctgg | 3700 |
| cggggttgcc | ttactggtta | gcagaatgaa  | tcaccgatac  | gcgagcgaac | 3750 |
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| tgggtcttcg | tttccgtggt | tcgtaaagtc  | tggaaacgcg  | gaagtcagcg | 3850 |
| ccctgcacca | ttatgttccg | gatctgcata  | gcaggatgct  | gctggctacc | 3900 |
| ctgtggaaca | cctacatctg | tattaacgaa  | gcgctggcat  | tgaccctgag | 3950 |
| tgatttttct | ctgggtccgc | cgcataccata | ccgccagttg  | tttaccctca | 4000 |
| caacgttcca | gtaaccgggc | atgttcatca  | tcagtaaccc  | gtatcgtgag | 4050 |
| catcctctct | cgtttcatcg | gtatcattac  | ccccatgaac  | agaaattccc | 4100 |
| ccttacacgg | aggcatcaag | tgaccaaaca  | ggaaaaaacc  | gcccttaaca | 4150 |
| tggcccgctt | tatcagaagc | cagacattaa  | cgcttctgga  | gaaactcaac | 4200 |
| gagctggacg | cggatgaaca | ggcagacatc  | tgtgaatcgc  | ttcacgacca | 4250 |
| cgctgatgag | ctttaccgca | gctgcctcgc  | gcgtttcggg  | gatgacgggt | 4300 |
| aaaacctctg | acacatgcag | ctcccggaga  | cggtcacagc  | ttgtctgtaa | 4350 |
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| aggcgctctt | ccgcttcctc | gctcactgac  | tcgctgcgct  | cggtcgcttc | 4600 |
| gctgcggcga | gcggtatcag | ctcactcaaa  | ggcggtaata  | cggttatcca | 4650 |
| cagaatcagg | ggataacgca | ggaaagaaca  | tgtgagcaaa  | aggccagcaa | 4700 |
| aaggccagga | accgtaaaaa | ggccgcggtg  | ctggcggttt  | tccataggct | 4750 |
| ccgccccctt | gacgagcatc | acaaaaatcg  | acgctcaagt  | cagagggtgg | 4800 |
| gaaacccgac | aggactataa | agataccagg  | cgtttcccc   | tggaagctcc | 4850 |
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| gtccaacccg | gtaagacacg | acttatcgcc  | actggcagca  | gccactggta | 5100 |

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CGTCTCTCTG

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<223> recombinant immunoglobulin

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<211> 256

<212> PRT



<213> Artificial Sequence

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<221> Artificial Sequence

<222> 1-256

<223> recombinant immunoglobulin

<400> 70

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| Met | Lys | Lys | Asn | Ile | Ala | Phe | Leu | Leu | Ala | Ser | Met | Phe | Val | Phe |  |
| 1   |     |     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |  |
| Ser | Ile | Ala | Thr | Asn | Ala | Tyr | Ala | Glu | Val | Gln | Leu | Val | Gln | Ser |  |
|     |     |     |     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |  |
| Gly | Gly | Gly | Leu | Val | Gln | Pro | Gly | Gly | Ser | Leu | Arg | Leu | Ser | Cys |  |
|     |     |     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |  |
| Ala | Ala | Ser | Gly | Tyr | Ser | Phe | Ser | Ser | His | Tyr | Met | His | Trp | Val |  |
|     |     |     |     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |  |
| Arg | Gln | Ala | Pro | Gly | Lys | Gly | Leu | Glu | Trp | Val | Gly | Tyr | Ile | Asp |  |
|     |     |     |     | 65  |     |     |     |     | 70  |     |     |     |     | 75  |  |
| Pro | Ser | Asn | Gly | Glu | Thr | Thr | Tyr | Asn | Gln | Lys | Phe | Lys | Gly | Arg |  |
|     |     |     |     | 80  |     |     |     |     | 85  |     |     |     |     | 90  |  |
| Phe | Thr | Leu | Ser | Arg | Asp | Asn | Ser | Lys | Asn | Thr | Ala | Tyr | Leu | Gln |  |
|     |     |     |     | 95  |     |     |     |     | 100 |     |     |     |     | 105 |  |
| Met | Asn | Ser | Leu | Arg | Ala | Glu | Asp | Thr | Ala | Val | Tyr | Tyr | Cys | Ala |  |
|     |     |     |     | 110 |     |     |     |     | 115 |     |     |     |     | 120 |  |
| Arg | Gly | Asp | Tyr | Arg | Tyr | Asn | Gly | Asp | Trp | Phe | Phe | Asp | Val | Trp |  |
|     |     |     |     | 125 |     |     |     |     | 130 |     |     |     |     | 135 |  |
| Gly | Gln | Gly | Thr | Leu | Val | Thr | Val | Ser | Ser | Ala | Ser | Thr | Lys | Gly |  |
|     |     |     |     | 140 |     |     |     |     | 145 |     |     |     |     | 150 |  |
| Pro | Ser | Val | Phe | Pro | Leu | Ala | Pro | Ser | Ser | Lys | Ser | Thr | Ser | Gly |  |
|     |     |     |     | 155 |     |     |     |     | 160 |     |     |     |     | 165 |  |
| Gly | Thr | Ala | Ala | Leu | Gly | Cys | Leu | Val | Lys | Asp | Tyr | Phe | Pro | Glu |  |
|     |     |     |     | 170 |     |     |     |     | 175 |     |     |     |     | 180 |  |
| Pro | Val | Thr | Val | Ser | Trp | Asn | Ser | Gly | Ala | Leu | Thr | Ser | Gly | Val |  |
|     |     |     |     | 185 |     |     |     |     | 190 |     |     |     |     | 195 |  |
| His | Thr | Phe | Pro | Ala | Val | Leu | Gln | Ser | Ser | Gly | Leu | Tyr | Ser | Leu |  |
|     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |     | 210 |  |
| Ser | Ser | Val | Val | Thr | Val | Pro | Ser | Ser | Ser | Leu | Gly | Thr | Gln | Thr |  |
|     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     | 225 |  |
| Tyr | Ile | Cys | Asn | Val | Asn | His | Lys | Pro | Ser | Asn | Thr | Lys | Val | Asp |  |
|     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |  |
| Lys | Lys | Val | Glu | Pro | Lys | Ser | Cys | Asp | Lys | Thr | His | Thr | Cys | Pro |  |
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Pro  
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 <213> Artificial Sequence

<220>  
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 <222> 1-452  
 <223> recombinant immunoglobulin

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                   20                  25                  30  
 Ser His Tyr Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu  
                   35                  40                  45  
 Glu Trp Val Gly Tyr Ile Asp Pro Ser Asn Gly Glu Thr Thr Tyr  
                   50                  55                  60  
 Asn Gln Lys Phe Lys Gly Arg Phe Thr Leu Ser Arg Asp Asn Ser  
                   65                  70                  75  
 Lys Asn Thr Ala Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp  
                   80                  85                  90  
 Thr Ala Val Tyr Tyr Cys Ala Arg Gly Asp Tyr Arg Tyr Asn Gly  
                   95                  100                  105  
 Asp Trp Phe Phe Asp Val Trp Gly Gln Gly Thr Leu Val Thr Val  
                   110                  115                  120  
 Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro  
                   125                  130                  135  
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 Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln  
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 Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr

|                 | 245                 | 250                 | 255 |
|-----------------|---------------------|---------------------|-----|
| Leu Met Ile Ser | Arg Thr Pro Glu Val | Thr Cys Val Val Val | Asp |
|                 | 260                 | 265                 | 270 |
| Val Ser His Glu | Asp Pro Glu Val Lys | Phe Asn Trp Tyr Val | Asp |
|                 | 275                 | 280                 | 285 |
| Gly Val Glu Val | His Asn Ala Lys Thr | Lys Pro Arg Glu Glu | Gln |
|                 | 290                 | 295                 | 300 |
| Tyr Asn Ser Thr | Tyr Arg Val Val Ser | Val Leu Thr Val Leu | His |
|                 | 305                 | 310                 | 315 |
| Gln Asp Trp Leu | Asn Gly Lys Glu Tyr | Lys Cys Lys Val Ser | Asn |
|                 | 320                 | 325                 | 330 |
| Lys Ala Leu Pro | Ala Pro Ile Glu Lys | Thr Ile Ser Lys Ala | Lys |
|                 | 335                 | 340                 | 345 |
| Gly Gln Pro Arg | Glu Pro Gln Val Tyr | Thr Leu Pro Pro Ser | Arg |
|                 | 350                 | 355                 | 360 |
| Glu Glu Met Thr | Lys Asn Gln Val Ser | Leu Thr Cys Leu Val | Lys |
|                 | 365                 | 370                 | 375 |
| Gly Phe Tyr Pro | Ser Asp Ile Ala Val | Glu Trp Glu Ser Asn | Gly |
|                 | 380                 | 385                 | 390 |
| Gln Pro Glu Asn | Asn Tyr Lys Thr Thr | Pro Pro Val Leu Asp | Ser |
|                 | 395                 | 400                 | 405 |
| Asp Gly Ser Phe | Phe Leu Tyr Ser Lys | Leu Thr Val Asp Lys | Ser |
|                 | 410                 | 415                 | 420 |
| Arg Trp Gln Gln | Gly Asn Val Phe Ser | Cys Ser Val Met His | Glu |
|                 | 425                 | 430                 | 435 |
| Ala Leu His Asn | His Tyr Thr Gln Lys | Ser Leu Ser Leu Ser | Pro |
|                 | 440                 | 445                 | 450 |
| Gly Lys         |                     |                     |     |
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<211> 219

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<220>

<221> Artificial Sequence

<222> 1-219

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<400> 72

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|---|
| Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val |
| 1 5 10 15   |

|   |
|---|
| Gly Asp Arg Val Thr Ile Thr Cys Arg Ser Ser Gln Ser Leu Val |
| 20 25 30  |

|     |     |     |     |            |     |     |     |            |            |     |     |     |     |            |
|-----|-----|-----|-----|------------|-----|-----|-----|------------|------------|-----|-----|-----|-----|------------|
| His | Gly | Ile | Gly | Ala<br>35  | Thr | Tyr | Leu | His        | Trp<br>40  | Tyr | Gln | Gln | Lys | Pro<br>45  |
| Gly | Lys | Ala | Pro | Lys<br>50  | Leu | Leu | Ile | Tyr        | Lys<br>55  | Val | Ser | Asn | Arg | Phe<br>60  |
| Ser | Gly | Val | Pro | Ser<br>65  | Arg | Phe | Ser | Gly        | Ser<br>70  | Gly | Ser | Gly | Thr | Asp<br>75  |
| Phe | Thr | Leu | Thr | Ile<br>80  | Ser | Ser | Leu | Gln        | Pro<br>85  | Glu | Asp | Phe | Ala | Thr<br>90  |
| Tyr | Tyr | Cys | Ser | Gln<br>95  | Ser | Thr | His | Val        | Pro<br>100 | Leu | Thr | Phe | Gly | Gln<br>105 |
| Gly | Thr | Lys | Val | Glu<br>110 | Ile | Lys | Arg | Thr        | Val<br>115 | Ala | Ala | Pro | Ser | Val<br>120 |
| Phe | Ile | Phe | Pro | Pro<br>125 | Ser | Asp | Glu | Gln        | Leu<br>130 | Lys | Ser | Gly | Thr | Ala<br>135 |
| Ser | Val | Val | Cys | Leu<br>140 | Leu | Asn | Asn | Phe        | Tyr<br>145 | Pro | Arg | Glu | Ala | Lys<br>150 |
| Val | Gln | Trp | Lys | Val<br>155 | Asp | Asn | Ala | Leu        | Gln<br>160 | Ser | Gly | Asn | Ser | Gln<br>165 |
| Glu | Ser | Val | Thr | Glu<br>170 | Gln | Asp | Ser | Lys        | Asp<br>175 | Ser | Thr | Tyr | Ser | Leu<br>180 |
| Ser | Ser | Thr | Leu | Thr<br>185 | Leu | Ser | Lys | Ala        | Asp<br>190 | Tyr | Glu | Lys | His | Lys<br>195 |
| Val | Tyr | Ala | Cys | Glu<br>200 | Val | Thr | His | Gln        | Gly<br>205 | Leu | Ser | Ser | Pro | Val<br>210 |
| Thr | Lys | Ser | Phe | Asn<br>215 | Arg | Gly | Glu | Cys<br>219 |            |     |     |     |     |            |